

What is claimed is:

1. A filter assembly comprising:
  - a hood;
  - a drain manifold;
  - a filter disposed between the hood and the drain manifold;
  - a drainage space that is disposed between and in fluid communication with both the filter medium and the drain manifold;
  - a check valve that is configured to permit air to escape but not to enter the drainage space, such that a siphon can be established that draws additional fluid through the filter medium and into the drain manifold, the siphon continuing until air entering the hood disrupts the siphon; and
  - a check valve cap that is configured to permit air to escape the check valve while preserving an air-filled void above the check valve when the filter assembly is submerged in fluid.
2. The filter assembly of claim 1, where the check valve cap is further configured to preserve an air-filled void beneath the check valve when the filter assembly is submerged.

3. The filter assembly of claim 1, where the check valve cap has a lower lip that is disposed below the level of the check valve.

4. The filter assembly of claim 1, where the check valve cap has an interior surface that includes at least one channel configured to permit air to escape from beneath the check valve cap.

5. The filter assembly of claim 4, where the check valve cap has an interior surface that includes a plurality of channels configured to permit air to escape from beneath the check valve.

6. The filter assembly of claim 4, where the channel extends vertically along the interior surface of the check valve cap to a lower lip of the check valve cap.

7. The filter assembly of claim 1, where the check valve is located at the top of an inner drainage space cap, and the check valve cap is configured to positively engage the inner drainage space cap.

8. The filter assembly of claim 7, where the check valve cap has an interior surface that includes a threaded region, so that the check valve cap may threadedly engage the inner drainage space cap.

9. The filter assembly of claim 8, where the check valve cap has an interior surface that includes at least one vertically-extending channel in the threaded region of the check valve cap so as to permit air to escape from beneath the check valve cap while the check valve cap is threadedly engaged with the inner drainage space cap.

10. The filter assembly of claim 1, where the check valve is constructed from plastic.

11. The filter assembly of claim 1, wherein the hood has a lower horizontal edge, and the established siphon can continue until air entering the hood under the lower edge disrupts the siphon.

12. The filter assembly of claim 1, wherein the hood defines a plurality of voids arranged in a horizontally-aligned array, and the established siphon continues until air entering the hood via the plurality of voids disrupts the siphon.

13. The filter assembly of claim 1, further comprising a drain valve assembly within the drainage space, the drain valve assembly configured to permit a first rate of fluid flow from the drainage space to the drain manifold until the drainage space is filled with fluid to a specified depth, whereupon the drain valve assembly permits a second increased rate of fluid flow to the drain manifold, the second rate of fluid flow acting in combination with the siphon to draw additional fluid through the filter and into the drain manifold, and where disruption of the siphon restores the first rate of fluid flow.

14. A filter assembly for removing pollutants from stormwater, comprising:

- a cylindrical hood having a lower edge, the hood incorporating a horizontally-aligned array of voids near the lower edge;
- a cylindrical drainage space disposed concentrically within the hood;
- a filter, disposed in the annular space between the hood and the drainage space, and in fluid communication with the drainage space;
- a check valve in the hood, configured to permit air to escape the filter assembly in response to rising stormwater within the hood, but to prevent air from entering the filter assembly; and
- a check valve cap that is coupled to the hood, where the check valve cap is configured to permit air to escape the check valve and to prevent stormwater from contacting the check valve.

15. The filter assembly of claim 14, where the check valve cap is configured to preserve an air-filled void around the check valve when the filter assembly is submerged in stormwater.

16. The filter assembly of claim 14, where the filter comprises a cylindrical screen that physically filters the stormwater.

17. The filter assembly of claim 16, where the filter further comprises a granular filter medium selected to remove contaminants by physical filtration

18. The filter assembly of claim 17, where the filter further comprises a granular filter medium selected to remove contaminants from the stormwater by mechanical action, chemical action, biological action, or by a combination thereof.

19. The filter assembly of claim 14, where each void is vertically elongate with rounded edges and does not overlap the lower edge of the hood.

20. The filter assembly of claim 14, further comprising:

a drain manifold disposed within the hood that is in fluid communication with the drainage space;

a drain valve disposed between the drainage space and the drain manifold, the drain valve configured to partially or completely restrict water flow from the drainage space into the drain manifold and thereby moderate the water flow through the filter; and

a float assembly comprising a buoyant float within the drainage space and a linkage connecting the float to the drain valve, the float assembly configured so that when the drainage space fills with water to a determined depth, the float assembly rises and fully opens the drain valve to permit increased water flow from the drainage space into the drain manifold.

21. The filter assembly of claim 20, where the increased water flow from the drainage space into the drain manifold establishes a siphon effect that draws additional stormwater through the filter and into the drainage space, the siphon effect continuing until air entering the hood via the array of voids disrupts the siphon effect, lowers the float assembly, and restricts water flow from the drainage space into the drain manifold.

22. The filter assembly of claim 21, where air entering the hood via the array of voids creates turbulence in a region between the hood and the filter, dislodging particulate matter that has accumulated on the filter.